

PATENT SPECIFICATION

(11)

1 597 455

1 597 455

(21) Application No. 9305/78 (22) Filed 9 March 1978

(44) Complete Specification published 9 Sept. 1981

(51) INT. CL.³ A47L 17/08

(52) Index at acceptance

A4F 35A4 35AX 35F1 35F3D 35F6 35F8

(72) Inventor CHARLES McCALLA

(54) ABRASIVE PRODUCT



(71) We, FLOCK DEVELOPMENT & RESEARCH COMPANY LIMITED, a British Company, of Clarence Mill, Clarence Street, Stalybridge, Cheshire, SK15 1QF, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

10 This invention concerns an abrasive product and has for its object to provide a form of abrasive block or pad which has the advantage, as compared with prior similar products, that it has a relatively longer useful life, since abraded material will not readily clog its abrasive and any such material which may accumulate on the product in use can readily be dislodged, and which can be produced in a wide range of degrees of abrasiveness in a simple and convenient manner.

15 With this object in view, the present invention provides an abrasive product comprising a block or pad consisting of a body of a flexible open-celled cellular material having a surface which is substantially planar, which is interrupted only by cells of the material opening to said surface, and which is coated with abrasive particles adhered to the body, the cells which open to 30 the coated surface being substantially free of the abrasive particles.

The body may be made of natural sponge or artificial sponge. Preferably, it is made of a foamed plastics material.

35 The abrasive particles may, for example, be of pumice, glass, sand, carborundum ("Carborundum" is a Registered Trade Mark.) or the like, adhered to the body by a flexible adhesive.

40 As another possibility, the abrasive product may comprise fibres adhered to and upstanding from the body, the abrasive particles having polymerised resin nodules, globules, tubercles or the like interspersed in said fibres as described in the specification of our prior patent application No. 29130/77 (Serial No. 1 539 477). Then the resin, which may be an acrylic resin, can, if desired, serve to adhere further abrasive 50 particles, of pumice, glass, sand, carborun-

dum or the like, to the fibres.

The invention further provides a method of producing an abrasive product as aforesaid which comprises adhering abrasive particles as a coating over a surface of a body of a flexible open-celled cellular material, which surface is interrupted only by cells of the material opening to said surface, so that those cells of the body which are open to said surface are substantially free of said abrasive particles.

In one way of carrying out the method, abrasive particles are adhered in place by a flexible adhesive which is applied to the body and thereafter caused or permitted to 65 cure or set as a flexible layer anchoring the particles to the body.

In another way of carrying the method into effect there are fibres upstanding from and adhered to the body, the abrasive particles being globules, nodules, tubercles or 70 like particles of resin applied to the fibres so as to become interspersed therein, the resin then being polymerised.

In order that the invention may be fully 75 understood, it will be described further, by way of example, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of a preferred embodiment of the abrasive product in 80 accordance with the invention, in the form of an abrasive block;

Fig. 2 is a fragmentary enlarged sectional elevation illustrating the product of Fig. 1 in an intermediate stage in its production; 85

Fig. 3 is a view similar to Fig. 2 but illustrating the product in its finished state;

Fig. 4 is an elevation illustrating a practical way of carrying the method of the invention into effect, and for producing the pro- 90 duct of Figs. 1 and 3;

Fig. 5 is a view similar to Fig. 4 but illustrating another practical way of producing the product of Figs. 1 and 3;

Fig. 6 is a view similar to Figs. 2 and 3 but showing a second form of the product of the invention; and

Fig. 7 is a similar view showing a third form of the product of the invention.

As illustrated in Figs. 1 to 3, a preferred 100

form of the abrasive product according to the invention comprises a rectangular block or pad 10 of an open-pored flexible plastics material, of a consistency corresponding approximately to that of a natural sponge material, so that it contains a high percentage of relatively large cells 11, for example, of one eighth of an inch or more across the maximum width, of which a high proportion are open to the surfaces of the block or pad 10.

In accordance with the invention, one substantially planar face, which is interrupted only by the cells which open to said face, and which is indicated generally by the reference numeral 12, of the block or pad 10 is provided with a coating 13 of an adhesive (which in its set or cured condition is flexible) applied in such a manner that none or an insignificant amount of the adhesive enters the relatively large cells which open to said face 12. This is illustrated, diagrammatically and to an enlarged scale, in Fig. 2.

Once the adhesive layer 13 has been applied, the block is made abrasive by application to the surface of abrasive particles 14 which may be of any suitable material such as pumice, glass, sand or carborundum. This application is effected for instance by sprinkling on to the adhesive layer 13.

One way of doing this is shown in Fig. 4. As shown, a continuous web 20 of the open-celled plastics material for forming a plurality of the blocks 10 is progressed past a spraying nozzle 21 which sprays an air jet 22, entraining particles of liquid adhesive as a spray, onto the web 20 at an acute angle to the general plane of the web 20. The angle of the nozzle 21 is so chosen that either only an insignificant amount of adhesive, or no adhesive at all, is deposited in the large cells 11 in the web surface exposed to the jet 22, the air stream entering these cells reversing in direction and leaving the cells again, and preventing deposition of the adhesive.

Once its upper surface has had the adhesive layer 13 (which, therefore, covers the relative web surface except at the large cells 11 open to said surface) applied, the web 20 passes under an abrasive particle applicator, indicated generally by the numeral 23, comprising a vibratory sprinkler 24 which serves to sprinkle abrasive particles 25 onto the applied adhesive to become anchored to the web 20. Upon allowing or causing the adhesive to set or cure (dependant upon the nature of the adhesive), the adhesive coated web is severed into blocks or pads, such as that shown in Fig. 1. Because the block or pad is flexible it will mould itself to the contours of the article being abraded. Further, because the block or pad is both flexible and of open-celled form, one obtains the advantage that the abrasive product of the invention will remain useful for a much longer

period than a comparable product having, for example a plastics block or pad which is not open-celled.

This is because the particles abraded off the work-piece are able to accumulate in the open or large cells and consequently do not clog the abrasive. Furthermore, the accumulated abraded material can subsequently be cleaned off the block or pad, by squeezing or compressing, and relaxing the same, if desired whilst submerged in a cleaning liquid such as water.

Fig. 5 shows another way of making the blocks or pads, and those parts which are similar to those already described with reference to Fig. 4 have been allocated similar numerals and do not require further description. In this case, in contrast to the spraying technique of Fig. 4 adhesive 30 is applied by "printing" it on the relative surface of the web 20 by a transfer roller assembly 31 including a roller 32 dipping into an adhesive trough 33 and serving to transfer an adhesive coating to an intermediate roller 34 which, in turn supplies the adhesive to a printing roller 35 which engages the web 20 and, of course, prints only the web surface and does not apply any adhesive into the open-cells of the material of the web 20. The web 20 coated with adhesive in this way is progressed under the applicator 23 for abrasive particles 25 to be applied, and is subsequently cut up into blocks or pads, as before.

The invention is not confined to the precise details of the foregoing examples, and variations may be made thereto without departing from the scope of the following claims. Thus, for instance, the block or pad may be of a shape or configuration other than rectangular and may have abrasive particles adhered to two or more surfaces thereof. Furthermore, it is not necessary for the entire block surface (other than the open-cells opening thereto) to be adhesive coated, and it is possible (e.g. by use of an appropriate printing roller 35) to apply the adhesive only over localised areas, for the abrasive particles to be adhered only in such areas with other areas being free of the adhesive. If desired, as shown in Fig. 6, after application of the adhesive 13 to the surface of the cellular body, nylon or other short-length fibres 40 may be electrostatically deposited on the adhesive 13 so as to be upstanding from the adhesive 13. These fibres 40 are, then, interspersed with, and have adhered thereto, nodules, globules, tubercles or like particles 41 of polymerised acrylic resin, which may serve to adhere the fibres 40 together in groups, all as described in detail in our aforementioned prior patent application. If desired, as shown in Fig. 7, the resin 41 may serve to anchor additional abrasive particles 42 of pumice, glass, sand, 13

carborundum, or other highly abrasive material, to the upstanding fibres 40, also as described in our aforementioned prior patent application.

- 5 The material of the body may be any suitable resilient open-celled foam material, which may be natural or synthetic.

WHAT WE CLAIM IS:

1. An abrasive product comprising a block or pad consisting of a body of a flexible open-celled cellular material having a surface which is substantially planar, which is interrupted only by cells of the material opening to said surface, and which is coated with abrasive particles adhered to the body, the cells which open to the coated surface being substantially free of the abrasive particles.

2. An abrasive product as claimed in Claim 1 wherein the body is of a foamed plastics material.

3. An abrasive product as claimed in Claim 1 or 2 wherein the body is of rectangular configuration.

4. An abrasive product as claimed in Claim 3 wherein the particle coating is provided on one surface only of the body.

5. An abrasive product as claimed in any preceding claim wherein the abrasive particles are adhered to the body by a flexible adhesive.

6. An abrasive product as claimed in Claim 5 wherein the abrasive particles are adhered only to localised areas of the said surface.

7. An abrasive product as claimed in any of Claims 1 to 4 wherein the product comprises fibres adhered to and upstanding from the body, the abrasive particles being polymerised resin nodules, globules, tubercles or the like interspersed in said fibres.

8. An abrasive product as claimed in Claim 7 wherein the resin serves to adhere further abrasive particles to the fibres.

9. An abrasive product substantially as hereinbefore described with reference to and as illustrated in Figs. 1, 2 and 3 or in Fig. 6 or in Fig. 7 of the accompanying drawings.

10. A method of producing an abrasive product, as defined in Claim 1, which comprises adhering abrasive particles as a coat-

ing over a surface of a body of a flexible open-celled cellular material, which surface is interrupted only by cells of the material opening to said surface, so that those cells of the body which are open to said surface are substantially free of said abrasive particles.

11. A method as claimed in Claim 10 in which the abrasive particles are adhered in place by a flexible adhesive which is applied to the body and thereafter caused or permitted to cure or set as a flexible layer anchoring the particles to the body.

12. A method as claimed in Claim 10 wherein there are fibres upstanding from and adhered to the body, the abrasive particles being globules, nodules, tubercles or like particles of resin applied to the fibres so as to become interspersed therein, the resin then being polymerised.

13. A method as claimed in Claim 12 which further includes applying additional particles of abrasive material so as to become adhered to the fibres by the resin.

14. A method as claimed in any of Claims 9 to 12 wherein the adhesive is applied by means of a spraying nozzle in such a manner that an air current carrying the adhesive in the form of a spray serves to minimise or prevent deposition of adhesive in said cells open to the said surface.

15. A method as claimed in any of claims 9 to 12 wherein the adhesive is applied by printing.

16. A method as claimed in Claim 11 or 13 wherein the abrasive particles or additional particles are applied by a vibratory particle sprinkler.

17. A method of making an abrasive product substantially as hereinbefore described with reference to and as illustrated in Figs. 1 to 3, in Fig. 4 in Fig. 5, in Fig. 6 or in Fig. 7 of the accompanying drawings.

For the Applicants:

BARLOW, GILLET & PERCIVAL,

Chartered Patent Agents,

94, Market Street,

Manchester 1.

and

20, Toaks Court,

Cursitor Street,

London E.C.4.

1597455

COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale

Sheet 1

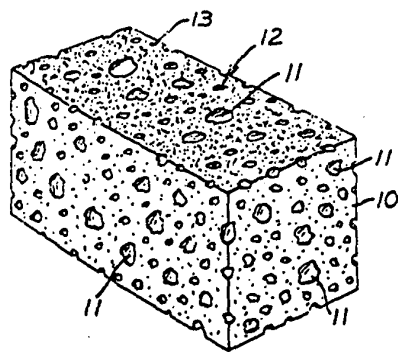


Fig. 1.

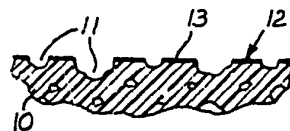


Fig. 2.

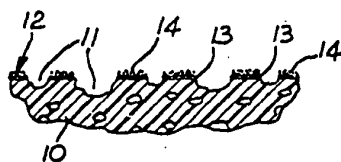


Fig. 3

1597455

COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheet 2

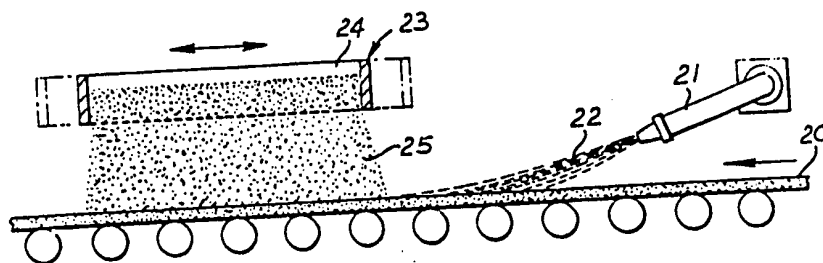


Fig. 4.

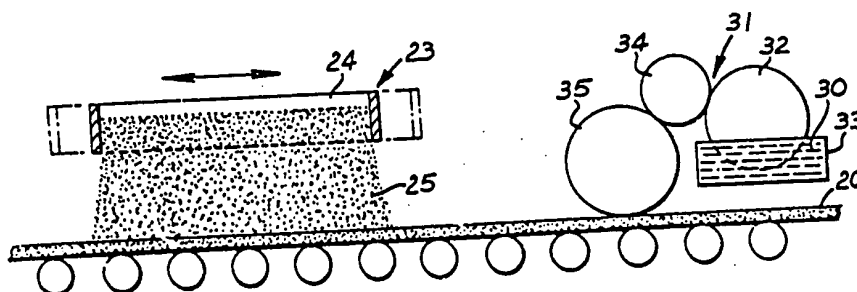


Fig. 5.

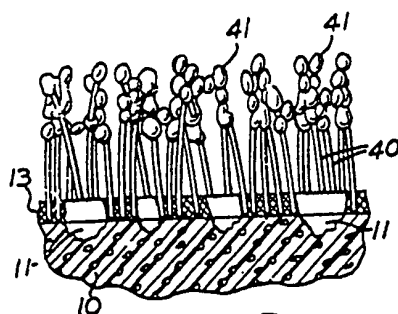


Fig. 6.

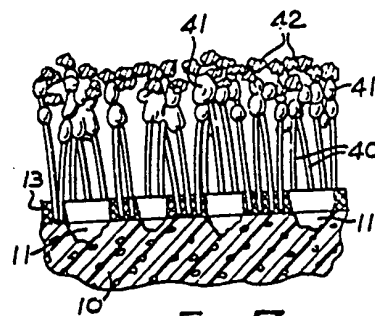


Fig. 7.